5) Methodology :

1) Sampling Process about 1 Liter of same Ware Collected From Selected Location then stored and Preserved as Per Standard Method.

2) Analysis Method :

pH Value : Check the pH instrument with pH buffer solutions that span the range of expected water sample pH values. Two fresh pH buffer solutions (7.00 and 4.00 or 7.00 and 10.00) having temperatures within 5 C of the samples are required for instrument calibration. Properly fill the probe with a salt solution, if required. Follow the manufacturer's instructions for the procedures and frequency of instrument calibration. Calibrate the instrument at least daily; more often is recommended and prudent. Record calibration data. Place the calibrated pH probe into a closed flow-through cell and allow the purge water to continuously flow past the probe. If you measure pH from a sample container, fill a container for this measurement only. Do not insert a pH probe into a sample that will later be analyzed for other parameters. Allow the pH probe to equilibrate with the water for a minute or more, then record pH. Do not remove the pH probe from the water while taking the reading. Read pH measurements to the nearest 0.1 pH units. Rinse the pH probe with reagent grade water and store in the buffer solution or as recommended by the equipment's manufacturer.

Colour : Note the color against a white background. If filtering is required, note the color after filtering. Document whether you noted sample color for a filtered or non- filtered sample. Describe the color by common descriptors or use an industry-recognized and standardized color description method (e.g., a color comparison disk for water). Record your observations.

Taste : Most of the smells in natural waters, with the exception of H2S are organic in nature. These are found in surface waters and are either very low or totally absent in deep well waters. Disagreeable smell and taste is objectionable for various industrial processes water.

Odour : It is neither required nor advocated that smelling of samples is necessary. If you do not know the type and approximate concentration of substances in a sample, do not attempt to smell it. Record sample odor only if you notice it unintentionally. If the type and concentration of substances are known carefully wave your hand over the sample and note any distinct odor.

Total Dissolved Solid : Water dissolves the minerals present in the strata of soil it filers through in the case of bore well water and, in the case of well water, the minerals present in the soil over which it flows over which it stands (lakes, ponds, reservoirs).The dissolved minerals in water are commonly referred to as Total Dissolved Solids (TDS). The TDS content of any water is expressed in milligrams /liter (mg/l) or in parts per million (ppm). These units are equivalent.

The minerals are basically compounds (salts) of Calcium(Ca), Magnesium(Mg) and Sodium(Na)

What is commonly called as 'hardness in water' is due to the compounds/salts of Ca and Mg such as Calcium or Magnesium Chloride, Calcium or Magnesium Sulphate (CaSo4, MgCl, etc).Some types of dissolved solids are specifically dangerous even in low quantities. This includes arsenic, fluorides and nitrates. There are particular standards for the acceptable amounts of these elements in water and in some cases like fluoride; there is some disagreement as to what constitutes safe levels.

Turbidity : Measure sample turbidity soon after collection, you may store samples in the dark for up to 24 hours before measuring turbidity. Shake the sample vigorously before measuring. Standard Methods for the Examination of Water discusses interferences and procedures for measuring turbidity.

Use a turbidity meter according to the manufacturer's instructions. Read turbidity to the nearest 0.1 Nephelometric Turbidity Unit (NTU) and record your measurement. In addition, provide this measurement to the laboratory if any samples will be analyzed for metals.

When you do not use a turbidity meter, describe the turbidity (e.g., slight, moderate) and record your observations or have a laboratory determine sample turbidity within 24 hours of sample collection.

Total Hardness as CaCO3

Hardness of water is due to presence of calcium and magnesium salts of bicarbonates, chlorides& sulphate. Bicarbonate causes temporary hardness which can be removed by boiling water. Sulphates and chlorides cause permanent hardness which can be difficult to remove. Hardness is expressed as mg of CaCO3 /L.

- Total Hardness = Magnesium Hardness + Calcium Hardness

Total Alkalinity as CaCO3

Alkalinity is mainly due to presence of carbonates, bicarbonate and hydroxide. Presence of silicates, phosphate in some cases also are contributing P-alkalinity – is measured at pH 8.5 Contributed by OH- ions M alkalinity _ is measured at pH 4.2 Contributed by HCO3,CO3 ions

Chloride as Cl : Chloride occurs naturally in water, and its concentration can range from a few to several thousands mg/L. When concentrations exceed 250 mg/L a salty taste to the water is detectable. There is no evidence that chloride in drinking water creates any adverse health effects, as consumption of chloride may be largely from food. However, high chloride levels may harm plant growth and corrupt metallic pipes and structures. The aesthetic objective is established at a maximum of 250 mg/L.

Calcium as Ca : Calcium is one of the major ions in well water. Levels above about 100ppm do not increase calcification.

Magnesium as Mg : Magnesium is the third most abundant ion in water. It is involved in a great many biological processes in every living organism. Reckless additions of Magnesium and other supplements without constant monitoring will often exasperate a chemical imbalance and more often than not do more harm than good.. Generally magnesium is a free ion, with only water molecules attached to it. Proper levels of Magnesium are important because it stabilizes carbonate and allows it to be present in far higher concentrations. Magnesium is also extremely important in the process of calcification.

Iron as Fe : Iron is commonly found in ferrous form. In contact with air, the ferrous iron gets converted to ferric ion to form ferric hydroxide. This ferric hydroxide is insoluble in water and precipitates out & deposits in the pipes, bends etc.

Phenolic Compound as C6H5OH :

Phenolic compounds are sometimes found in borewell water from natural and industrial sources.. Phenolic materials react with 4-aminoantipyrine in the presence of potassium ferricyanide at high pH to form a stable reddish-

brown colored antipyrine dye. The amount of color produced is proportional to the concentration of Phenolic materials. However the color response of all phenolic compounds is not equivalent and the results (which are compared against pure phenol standards) represent the minimum concentration of Phenolic compounds in the sample.

Bacteriological Quantity of Water :

Coliform & E.Coli The coliform bacteria are relatively simple to identify, are present in much larger numbers than the more dangerous pathogens, and react to the natural environment and treatment processes in a manner and degree similar to pathogens. Thus by observing coliform bacteria, the increase or decrease of many pathogenic bacteria can be estimated. The many sources of bacterial pollution include runoff from woodlands, pastures and feedlots; septic tanks and sewage plants; and animals and wild fowl. Domestic animals contribute heavily to the bacterial population. Many coliform bacteria enter natural streams by direct deposition of waste in the water and the runoff from areas with high concentrations of animals or humans.

While most coliforms are not pathogens, they serve as indicators of the microbial quality of water. Public health officials have tested for total coliform bacteria and fecal coliform bacteria for most of this century as a way of checking the quality of water. Pathogens – the bacteria, protozoa, and viruses that make people sick – can be rare and difficult to detect even

if they are present in the water. Total coliforms are indicators and are more common and easy to grow. Testing for them provides a margin of safety. Pathogens may not be present if coliforms are, but it would be wise to look for problems just in case.

Total coliforms are mostly natural residents of soil and water. Fecal coliforms are those that are usually found in the fecal material of animals. Their presence usually means that the water may be contaminated by sewage effluent. Finding the source of the problem and correcting it is very important.

Maybe, maybe not. Coli forms are not one kind of bacteria, but many. They are defined by what they do- grow on the sugar, lactose (the same as found in milk), and employ enzymes to help them use this sugar. Most coliforms are harmless residents of soil and will not make people sick. Some strains of E. coli, the most common fecal coliform bacterium (usually living in animal fecal material), may be pathogens. Some found in food have been lethal. Their presence should be taken very seriously. Your immune system also determines whether or not you will become ill. People become accustomed to the natural bacteria in their water while guests used to other water may have some discomfort or diarrhea. Immunocompromised individuals may become ill under circumstances where people with normal immune systems would not and such individuals should be very careful of the water they drink. Pathogenic (disease-producing) organisms occurring in water range from ultra-small viruses to microscopic bacteria to relatively large protozoa (cysts). Basically, three types of pathogenic organisms can affect the safety of water: bacteria, viruses, and protozoa. Bacteriologic and protozoic pathogens are known to cause typhoid, dysentery, cholera, and some types of gastroenteritis. Conventional wisdom is that contamination of ground water with protozoa indicates surface water influence. Viruses account for more than 100 human maladies including polio, infectious hepatitis, and

some forms of gastroenteritis. In general, viruses are more poisonous and more resistant to disinfection than bacteria.